<u>REMARKS</u>

Reconsideration of this application as amended is respectfully requested.

In the Office Action, claims 1-87 are pending and rejected. In this response, no claim

has been canceled. Claims 1, 28, 55, and 82 have been amended. No new matter has been

added.

Claims 1-87 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent

No. 6,363,475 by Dowling ("Dowling"). In view of the foregoing amendments, it is

respectfully submitted that claims 1-87 as amended include limitations that are not disclosed

by Dowling. Specifically, independent claim 1 recites as follows:

> 1. A method for dispatching instructions executed by at least one functional unit of a data processor, each one of the instructions having a corresponding priority number, in a computer system having at least one host processor and host memory, the method comprising:
>> in response to a next instruction <u>having a priority number which is pre-assigned prior to being associated with an instruction group</u>, examining a current instruction group, with respect to the priority number of the next instruction, to determine if the current instruction group is completed, each instruction in the current instruction group associated with <u>a priority number corresponding to a type of a functional unit for executing the respective instruction</u>, and wherein the current instruction group is formed based on a priority number of each instruction in the current instruction group and <u>availability</u> of the corresponding functional unit for executing each instruction;
>> adding the next instruction to the current instruction group if the current instruction group is not completed based on one or more predetermined conditions associated with the current instruction group; and
>> dispatching the current instruction group if the current instruction group is completed, wherein the current instruction group is completed when the one or more predetermined conditions are satisfied, <u>wherein the next instruction is not added to the current instruction group if a corresponding functional unit associated with the priority number of the next instruction is not available for execution.</u>

(Emphasis added)

Independent claim 1 includes limitations that an instruction group is formed based on a

priority of each instruction, where the priority of each instruction is pre-assigned prior to

being associated with an instruction group and the priority number is associated with a type of a functional unit for executing the respective instruction. For example, an instruction involving a floating unit have a priority number different than an instruction involving an integer unit, which has a different type of a floating point unit.

In addition, whether an instruction should be added to a current instruction group is determined based on whether a functional unit for executing the instruction (e.g., a functional unit corresponding to the priority number of the instruction) is available within the current group. This determination is performed based on the priority number of the instruction being added. For example, if a current instruction group already includes a first instruction that requires a floating point unit and the system only contains one floating point unit, a second instruction that requires a floating point unit would not be added to the current instruction group, since the floating point unit is not available (because it is already allocated to execute the first instruction within the current instruction group), even though there are more spaces within the instruction group to include additional instructions. It is respectfully submitted that the above limitations are absent from Dowling.

Although Dowling discloses assigning a priority to a stream of instructions, Dowling fails to disclose that each instruction is associated with a priority number (which is pre-assigned) corresponding to the type of functional unit for executing the respective instruction. See, for example, col. 3, line 31 to col. 4 line 7 of Dowling. Specifically, Dowling fails to disclose that an instruction will not be added to an instruction group if the functional unit associated with the priority number of the instruction for executing the instruction is unavailable.

The office action contends that section of col. 14, lines 3-23 of Dowling discloses the above limitations (see 5/31/2005 office action, page 3). Applicant respectfully disagrees. Specifically, Dowling states:

"The structure of FIG. 5 can also be applied when the auxiliary cache area 504 has zero entries. This is accomplished by using the two program counters 510, 512 to access the same VLIW cache 502. Normally when a program inefficiency occurs, multiple groups of instructions called execute packets will be dispatched from a single fetch packet. A fetch packet is a complete VLIW containing, for example, eight 32-bit instructions. An execute packet is a set of instructions that dispatch concurrently from the same fetch packet The fetch packet may contain, for example, four execute packets, each execute packet having two instructions. These execute packets will thus require four consecutive cycles to dispatch. Since only one fetch packet is fetched in this four-cycle period, the fetch portion of the pipeline will stall. Thus, several cycles is become available for the second program counter 512 to fetch a VLIV from the same VLfW cache 502 and to route this VLIW to the auxiliary prefetch register 520. In this case, a multiplexer is used to pass the output from the VLIW cache 502 to either the prefetch register 520 or the auxiliary prefetch register 530."

(Dowling, col. 14, lines 2-23).

Thus, the cited section of Dowling fails to disclose the limitations set forth above.

Although, each VLIW of Dowling may arguably be associated with a priority. However, such a priority is not the same as the one recited in the present application, especially, where each instruction of the present invention as claimed has a pre-assigned priority number corresponding to a type of the functional unit (e.g., floating point or integer unit) for executing the respective instruction.

In addition, the office action states:

"Execute packets are executed sequentially, i.e., the packet as a whole, and consequently, each of the instructions within the packet, have a priority. The instructions of the execute packet to be executed first have the highest priority. The instructions of the execute packet to be executed second have the second highest priority, and so on. In addition, the grouping is based on availability of functional units. See column 1, lines 49-55, and note that instructions are grouped so that the highest possible amount of instructions may execute concurrently on parallel functional units. So, overall, instructions are grouped based on execution unit availability (an instruction cannot be grouped and issued if a functional unit to execute it is not available) and based on priority (instructions that appear in the program earlier are executed earlier)."

(5/31/2005 office action, page 3).

Applicant respectfully disagrees. The priority interpreted by the office action is not the same as those recited in the claims, as discussed above. Further, it appears that such

interpretations are not found in Dowling. It appears that such interpretations are based on the impermissible hindsight of Applicant's own disclosure.

In order to anticipate a claim, each and every limitations of the claim must be taught by the cited reference. It is respectfully submitted that Dowling fails to disclose each and every limitations as recited in claim 1. Therefore, for the reasons discussed above, it is respectfully submitted that independent claim 1 is not anticipated by Dowling.

Similarly, independent claims 28, 55, and 82 include limitations similar to those recited in claim 1. Thus, for the reasons similar to those discussed above, independent claims 28, 55, and 82 are not anticipated by Dowling.

Given that the rest of the claims depend from one of the above independent claims, at least for the reasons similar to those discussed above, it is respectfully submitted that the rest of the claims are not anticipated by Dowling.

In addition, with respect to claims 3-5, 30-32, and 57-59, these claims include limitations of examining the priority of the next instruction to determine whether the priority of the next instruction is higher than those in the current group. If so, the next instruction will be placed into the current group if the current group has not been completed. Otherwise the priority of the next instruction is lower than or equal to those in the current group, the current group will be dispatched without adding the next instruction and the next instruction will be added to a next group. If the next instruction is required to be in a next group and the current group has not been completed, a NOOP instruction may be inserted into the current group before the current group is dispatched. It is respectfully submitted that the above limitations are absent from Dowling.

The office action contends that sections of the Abstract, Figs. 4-5, col. 3, line 54-col. 4, line 6, col. 12, line 41-col. 13, line 36, and col. 4, lines 3-23 of Dowling discloses the above

limitations (see, 12/13/2004 Office Action, pages 2-3). Applicant respectfully disagrees. The cited sections of Dowling are generally related to dispatching instructions.

Particularly, there is no disclosure within Dowling that <u>a next instruction having a lower priority number (which is pre-assigned and corresponding to a type of a functional unit for executing the respective instruction) than those in the current group, the next instruction will not be added to the current group</u>. If the priority of the next instruction is higher than or equal to those in the current group, the next instruction will be added if the current group is not completed.

It appears that the office action interprets Dowling based on the impermissible hindsight of the present application. Therefore, in addition to those discussed with respect to their respective independent claims, for the separate reasons discussed above, claims 3-5, 30-32, and 57-59 are not anticipated by Dowling.

With respect to claims 8, 35, and 60, these claims include limitations of stalling a period of time based on the latency of the functional unit executing a next instruction during forming the group, which are absent from Dowling.

Claims 1-2, 28-29, and 55-56 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,712,996 of Schepers ("Schepers"). Schepers is related in general to grouping instructions for parallel processes (see Abstract of Schepers). However, Schepers still fails to disclose forming an instruction group based on the technique set forth above. Particularly, there is no mention of forming an instruction group based on a priority number of each instruction, which corresponds to a type of the functional unit for executing the respective instruction. As a result, it is respectfully submitted that claims 1-87 are not anticipated by Schepers.

In view of the foregoing, Applicant respectfully submits the present application is now in condition for allowance. If the Examiner believes a telephone conference would expedite

or assist in the allowance of the present application, the Examiner is invited to call the undersigned attorney at (408) 720-8300.

Please charge Deposit Account No. 02-2666 for any shortage of fees in connection with this response.

Respectfully submitted,

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